hypertensive patients (15 males and 3 females; 69 ± 5 years of age), on Captopril (25 mg b.i.d.; n = 11) or Enalapril (20 mg o.d.; n = 7) treatments. Half of the patients received ACEI + NAC (1800 mg/day), while the other half only received ACEI. After 21 days the therapeutical regimen was crossed and then another 21 day period was completed. Ambulatory blood pressure (BP) monitoring was performed at the end of each therapeutical regimen in each patient and the results of both measurements (ACEI vs ACEI + NAC) were compared. Decreases ($p < 0.05$) in 24 h BP and daytime BP were achieved with the association of NAC to ACEI. 24 h BP: 146 ± 5 vs 137 ± 4 (systolic BP) and 89 ± 3 vs 83 ± 4 (diastolic BP) mmHg. Daytime BP: 149 ± 6 vs 141 ± 4 (systolic BP) and 92 ± 4 vs 86 ± 3 (diastolic BP) mmHg. Significant differences were observed neither in nighttime BP nor between both ACEI treatments. In summary, the association of NAC to ACEI potentiates the antihypertensive effect of these drugs during daytime and in 24 hours BP in smoker hypertensives. This might be due to the protective effect of NAC on NO oxidation. Thus, supplementation of ACEI treatments with NAC may give additional advantages to smoking hypertensive patients.

11:30

741-5 Comparison of Circulating Von Willebrand Factor Levels and Acetylcholine Responsiveness as Markers of Endothelial Dysfunction in Hypertensive and Atherosclerotic Patients

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Either increased circulating levels of von Willebrand Factor (vWF), a glycoprotein secreted in greater amounts by a dysfunctional endothelium, or blunted vasorelaxation to intraarterial (i.a.) forearm infusion of acetylcholine (Ach), a nitric oxide-releasing muscarinic agonist, are frequently taken as evidence for endothelial dysfunction in both hypertension (*Ht*) and atherosclerosis (*Ath*). However, the relationship between the two indices and their relative sensitivity as markers of disease, is unknown. vWF levels (%, immunoenzymatic method) and the forearm blood flow (FBF, ml/min × dl^{-1}, strain-gauge plethysmography) response to i.a. Ach (7.5, 15 and 30 μg/min × 5 min each) were evaluated in i) 8 CONTROLS (*NOR*, age: 60 ± 12, $ASBPM_{24\text{-}hr}$: 129 ± 12), ii) 11 Normotensives With Atherosclerotic Peripheral Vascular Disease (PVD) (*NOR-ATH*, age: 54 ± 8, $ASBPM_{24\text{-}hr}$: 128 ± 9), iii) 10 Non Atherosclerotic Essential Hypertensives (*EH*, age: 56 ± 10, $ASBPM_{24\text{-}hr}$: 148 ± 12) and iv) 11 EH With Atherosclerotic PVD (*EH-ATH*, age: 60 ± 7, $ASBPM_{24\text{-}hr}$: 154 ± 9).

vWF was 95 ± 39 and 104 ± 15 in *NOR-ATH* and *EH-ATH* vs 70 ± 26 and 67 ± 29% in *NOR* and *EH* ($p < 0.005$ for *Ath* vs *non-Ath*); Ht carried no difference ($p < 0.5$). Maximum vasorelaxing response to Ach ($FBF_{30\ \mu g/min}/FBF_{basal}$) was 4.8 ± 2 and 5.9 ± 2.2 vs 6.4 ± 3.5 and 5.2 ± 2.3, respectively; the difference (*Ath* vs *non-Ath*: $p < 0.09$; *Ht* vs *non-Ht*: $p < 0.6$) was not significant.

Biochemical and pharmacological markers for endothelial dysfunction are not equivalent. vWF is a sensitive marker for atherosclerotic status; on the contrary, the forearm vasorelaxing response to i.a. Ach differentiated neither *Ath* nor *Ht* in this particular series.

11:45

741-6 A Localized Defect in the Phosphoinositol Pathway May Explain the Impaired Endothelial Nitric Oxide Activity in Hypertensive Patients

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Patients with essential hypertension (HTs) have impaired endothelial nitric oxide (NO) activity. Although its mechanism is unknown, we have previously shown that the abnormality is not localized at the receptor or the G protein level. To investigate whether the endothelial dysfunction of HTs is related to a more distal defect in intracellular signal transduction, we studied the forearm blood flow response to intraarterial infusion of isoproterenol (ISO; 50–200 ng/min), a β_2 agonist that stimulates NO release through the G_s protein/cAMP pathway, and acetylcholine (Ach; 7.5–30 μg/min), an endothelial agonist that acts through the $G_{i/o}$/phosphoinositol pathway, in 12 normotensives (NTs) and 12 HTs. The infusion of ISO was repeated during the concurrent infusion of L-NMMA (4 μmol/min), a blocker of NO synthesis. The vasodilator response to ACh was significantly reduced in HTs compared to NTs (peak flow: 10.4 ± 4.6 vs. 14.4 ± 3.7 mL/min/dL; P = 0.008). However, the vasodilator effect of ISO was similar in NTs and HTs (peak flow: 14.4 ± 5.4 vs 13.5 ± 5 mL/min/dL; P = 0.56), and was significantly and equally blunted by L-NMMA in both groups (22 ± 15% in NTs vs 23 ± 16% in HTs; P = 0.83). The vasodilator response to sodium nitroprusside (0.8–3.2 μg/min), an exogenous NO donor, was similar in both groups and not modified by L-NMMA. Thus, in HTs with impaired endothelium-dependent vasodilation to ACh, the NO response to β_2-adrenergic stimulation is preserved. These findings suggest that the endothelial abnormality in hypertension is at least partly related to a defect in the pathway.

742 Atrial Arrhythmias

Tuesday, March 18, 1997, 10:30 a.m.–Noon
Anaheim Marriott, South Hall

10:30

742-1 Potential Pitfalls Using the P-wave Morphology in Leads aVL and V1 to Localize the Site of Origin of Atrial Tachycardias

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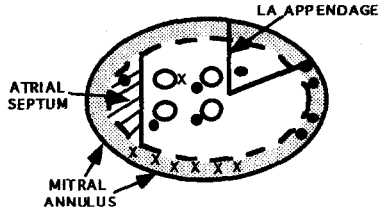
Preliminary reports suggest that the P-wave morphology on the 12 lead ECG can be used to localize the site of origin (*SOO*) of atrial tachycardias (*AT*). Specifically, a positive (+) P-wave in lead aVL during *AT* has been shown to predict the right atrium as the *SOO*, while a + P-wave in lead V1 during *AT* suggests a left atrial *SOO*. We report on the P-wave morphology of 16 left *AT* in 12 consecutive patients undergoing radiofrequency catheter ablation. Only one patient had multiple *AT*. Detailed mapping and localization of each *AT* was performed (Fig.). Ten of the *AT*'s were localized to the mitral valve annulus as indexed by fluoroscopy and amplitude of the ventricular electrogram recording. *Results:* The P-wave was + in lead aVL in 7 *AT*'s (*x*, in Fig.) and negative or isoelectric in 11 *AT*'s (•, in Fig.).



The P-wave was + in lead V1 for all of the *AT*'s. Six of the 7 *AT*'s with a + P-wave in aVL were localized to the inferomedial mitral valve annulus and demonstrated a similar P-wave precordial pattern characterized by a + P-wave in lead V1 and negative P-waves in leads V4–V6. The other *AT* with a + P-wave in aVL originated from adjacent to the right superior pulmonic vein and demonstrated a + P-wave in all precordial leads. *Conclusions:* A + P-wave in lead aVL during *AT* is not specific for a right atrial *SOO*. Left *AT*'s with a + P-wave in leads aVL and V1 appear to originate from either the inferomedial mitral annulus or right superior pulmonic vein region. A negative P-wave in leads V4–V6 further localizes the *SOO* to the inferomedial mitral annulus.

10:45

742-2 Body Surface Mapping of Counterclockwise and Clockwise Typical Atrial Flutter in Man

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Typical atrial flutter (AFl) can be characterized as counterclockwise (CCW) or clockwise (CW) based on the direction of rotation along the tricuspid annulus. Although the 12-lead ECG P wave morphology of typical AFl is well known, the total body surface flutter wave distribution has not been reported. Therefore, 62-lead body surface mapping was performed in 9 pts during a total of 12 distinct spontaneous or induced episodes of typical AFl (mean cycle length 233 ± 20 msec). Structural heart disease was present in 5 pts. Temporary AV conduction block using adenosine was obtained when necessary to isolate the P wave from the QRS and T wave. Confirmation of CCW or CW typical AFl was performed by activation and entrainment mapping to demonstrate participation of the subeustachian sinus as a critical isthmus. A body surface P wave integral map was computed for each AFl episode. Analysis of the P wave integral maps included: 1) visual assessment of the potential distribution; and 2) quantitative map comparison for either the group of CCW or CW AFl episodes using a jack-knife procedure resulting in a mean correlation coefficient and SD to express the level of pattern uniformity within each group. *Results:* There were 6 CCW and 6 CW AFl episodes all demonstrating a dipolar P wave integral map pattern. Maps